Alors $z_1 = z_2 = \frac{-b'}{a} = \frac{2i}{1} = 2i$

$$S_4 = \{3, 2i\}$$

Exercice n°6 :

$(E) : z^3 - (4+i)z^2 + (7+i)z - 4 = 0$

a/ (E) admet une racine réelle z_0 sig :

$z_0^3 - (4+i)z_0^2 + (7+i)z_0 - 4 = 0$

$i(z_0 - z_0^2) + z_0^3 - 4z_0^2 + 7z_0 - 4 = 0$

$\begin{cases} (z_0 - z_0^2) = 0 \iff z_0 = 0 \text{ ou } z_0 = 1 \\ z_0^3 - 4z_0^2 + 7z_0 - 4 = 0 \Rightarrow z_0 = 1 \end{cases}$

est la bonne solution.

d'où $z_0 = 1$ est la bonne solution (racine réelle)

équi $z^3 - (4+i)z^2 + (7+i)z - 4 = (z-1)[az^2 + bz + c]$

$az^3 + bz^2 + cz - az^2 - bz - c \Rightarrow$

$\begin{cases} a = 1 \\ b - a = -(4+i) \\ c - b = 4+i \Rightarrow b = 4 - 7 - i = -3 - i \\ -c = -4 \Rightarrow c = 4 \end{cases}$

$(E) : (z-1)[z^2 - (3+i)z + 4] = 0$

$z_0 = 1$ | $\Delta = [-(3+i)]^2 - 16 = -8 + 6i = (1+3i)^2$

| $\sqrt{\Delta} = 1 + 3i$

$z_1 = \frac{3+i - (1+3i)}{2} = \frac{2-2i}{2} = 1 - i$

$z_2 = \frac{3+i+1+3i}{2} = \frac{4+4i}{2} = 2 + 2i$

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